FORM PTO-1390 (REV 1-93) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

US APPLICATION NO (If known, see 37 CFR 1.5): 09/869188

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/AU99/01144	22 December 1999	22 December 1998

TITLE OF INVENTION
STRUCTURAL FRAMEWORK MEMBER FOR SUSPENDED FLOOR SYSTEMS

APPLICANT(S) FOR DO/EO/US
GOLLEDGE, Bradbury Frank

J804 Rec'd PCT/PTO 21 JUN 2001

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1)
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau. (w/IPEA/AU Report)
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☒ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is include
13. ☒ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: International Preliminary Examination Report

"Express Mail" mailing label number ET 302678019 US
Date of Deposit June 21, 2001

I hereby certify that this paper is being deposited with the U.S. Postal Service "Express Mail-Post Office to Addressee" service under 37 C.F.R. 1.10 on the date indicated above and is addressed to: Hon. Commissioner of Patents and Trademarks, Washington, D. C. 20231.

Edwin D. Schindler

Edwin D. Schindler, Reg. No. 31,459

June 21, 2001
Date

09/857188

17. [X] The following fees are submitted:

	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)): Search Report has been prepared by the EPO or JPO ..... $1,000.00 $~~890.00~~	Rec'd PCT/PTO 21 JUN 2001	
International preliminary examination fee paid to USPTO (37 CFR 1.482) **$640.00**		
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)).. **$710.00**		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37CFR 1.445(a)(2)) paid to USPTO..... **$950.00**		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)..... **$90.00**		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 1,000.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$ -0-	

Claims	Number Filed	Number Extra	Rate	
Total 23 Claims	23 -20 =	3	X ~~$22.00~~ 18.00	$ 54.00
Independent Claims	2 - 3 =	-0-	X $74.00	$ -0-
Multiple dependent claims(s) (if applicable)			+ $230.00	$ -0-

TOTAL OF ABOVE CALCULATIONS =	$ 1,054.00
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).	$ -0-
SUBTOTAL =	$ 1,054.00
Processing fee of **$130.00** for furnishing the English translation later the [ ] 20 [ ] 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +	$ -0-
TOTAL NATIONAL FEE =	$ 1,054.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +	$ -0-
TOTAL FEES ENCLOSED =	$ 1,054.00
Amount to be: refunded	$
charged	$

a. [X] A check in the amount of $*1,054.00 to cover the above fees is enclosed.

b. [ ] Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 19-0450. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Edwin D. Schindler
Five Hirsch Avenue
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SIGNATURE

Edwin D. Schindler
NAME

31,459
REGISTRATION NUMBER

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: BRADBURY F. COLLEDGE ART UNIT:

SERIAL NO.: 09/ EXAMINER:

FILED:

P.C.T. APPLICATION NO.: PCT/AU99/01144

P.C.T. INTERNATIONAL FILING DATE: DECEMBER 22, 1999

U.S. NATIONAL FEE PAID: JUNE 21, 2001

TITLE: STRUCTURAL FRAMEWORK MEMBER FOR SUSPENDED FLOOR SYSTEMS

PRELIMINARY AMENDMENT

Hon. Commissioner for Patents
United States Patent and Trademark Office
Box PCT
Washington, D. C. 20231

Dear Sir:

Prior to an examination on the merits of the above-identified patent application, please amend the above-identified application as follows:

IN THE ABSTRACT OF THE DISCLOSURE

Please use the accompanying Abstract of the Disclosure,

"Express Mail" mailing label number ET 302678019 US
Date of Deposit June 21, 2001

I hereby certify that this paper is being deposited with the U.S. Postal Service "Express Mail - Post Office to Addressee" service under 37 C.F.R. §1.10 on the date indicated above and is addressed to: Hon. Commissioner for Patents, United States Patent and Trademark Office, Washington, D. C. 20231.

Edwin D. Schindler, Reg. No. 31,459

June 21, 2001
Date

which is contained on a separate sheet of paper, as required by 37 C.F.R. §1.72(b), as the Abstract for the instant patent application.

IN THE CLAIMS

Please rewrite the following claims, as filed before the IPEA/AU on November 13, 2000, during Chapter II of the P.C.T. international phase, to now read as follows:

4. (Amended) The floor framing system as claimed in claim 1, wherein said elongate structural web members resemble an inverted top-hat section with two said flange elements and two said web elements with a third web element perpendicular to, and adjoining, the two said web elements.

5. (Amended) The floor framing system as claimed in claim 1, wherein said elongate structural web members resemble a box section with a slit in one side with two said flange elements being separated by the slit, two said web elements with a third web element perpendicular to, and adjoining, the two said web elements.

7. (Amended) The floor framing system as claimed in claim 4, wherein the ends of the web elements of the elongate web members are notched such that the flange elements of the web members enclose the web elements of the elongate structural members.

8. (Amended) The floor framing system as claimed in claim 4, wherein at least one of said elongate structural web members is bent into a vee profile.

10. (Amended) The floor framing system as claimed in claim 1, wherein longitudinal central axes of the elongate structural members and at least one of said structural web members are substantially aligned.

11. (Amended) The floor framing system as claimed in claim 1, wherein the elongate structural web members are perpendicular to [or diagonal to] said elongate structural members.

12. (Amended) The floor framing system as claimed in claim 1, wherein the elongate structural members are substantially parallel.

13. (Amended) The floor framing system as claimed in claim 1, wherein the elongate structural members are substantially in the same plane and form a triangular framework geometry.

14. (Amended) The floor framing system as claimed in claim 1, wherein the flanges of the elongate structural members are extended and over bent flange stiffening elements.

15. (Amended) The floor framing system as claimed in

claim 1, wherein the floor system is stiffened by at least one stiffening member oriented substantially perpendicular to the longitudinal axes of the elongate structural members.

20. (Amended) The floor framing system as claimed in claim 17, wherein the ends of the web elements of the elongate web members are notched such that the flange elements of the web members mate with the web elements of the elongate structural members.

21. (Amended) The floor framing system as claimed in claim 17, wherein at least one of said elongate structural web members is bent into a vee profile.

Please add the following claims:

--22. The floor framing system as claimed in claim 1, wherein the elongate structural web members are diagonal to said elongate structural members.

23. The floor framing system as claimed in claim 1, wherein the elongate structural members are substantially in the same plane and form a trapezoidal framework geometry.--

REMARKS

Prior to an examination on the merits of the above-identified patent application, please enter the foregoing amendments.

The present application represents the U.S. National Phase of P.C.T. Application No. PCT/AU99/01144, filed December 22, 1999, and claiming foreign priority on the basis of a corresponding Australian patent application, filed December 22, 1998.

Claims 1-23 are now pending in the above-identified patent application, as presented before the International Preliminary Examining Authority (IPEA/AU) on November 13, 2000, and as amended by the instant Preliminary Amendment. Claim 1 and 16 are presented in independent form.

By the present amendment, dependent Claims 4, 5, 7, 8, 10-15, 20 and 21 have been amended in order to remove the multiple dependencies therefrom. Claims 22 and 23 have been added in order to recite alternative embodiments originally within the scope of Claims 11 and 13, respectively. Various amendments have also been entered into the claims for the purpose of improved form.

An Abstract on a separate sheet of paper, as required by 37 C.F.R. §1.72(b), is enclosed.

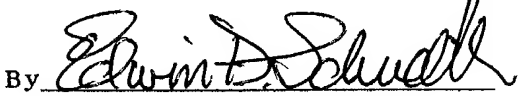
A "marked-up" version of the claim amendments being entered is attached to this Preliminary Amendment.

The application is now in condition for a full examination on the merits.

Accordingly, an early examination on the merits and allowance are, therefore, respectfully requested and earnestly solicited.

Respectfully submitted,

BRADBURY F. COLLEDGE

By 
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ABSTRACT OF THE DISCLOSURE

A floor framing system includes a plurality of elongate load bearing framework members, which are supported by the building or foundations thereof, and which support flooring material, or the like. The elongate load bearing framework members have, at least, two elongate structural members and at least one structural web member extending between the elongate structural members. The elongate structural members have at least one web element which is substantially upright and at least one flange element which is perpendicular to the web element. The web structural member has at least one web element which is substantially upright and at least one flange element which is perpendicular to the web element, so that the, at least, one web element of the web elements mate with the, at least, one web element of the elongate structural members such that a connection device can be applied at the mating locations.

VERSION OF AMENDMENTS WITH MARKINGS TO SHOW CHANGES MADE
(Dated June 21, 2001)

IN THE CLAIMS

Please rewrite the following claims, as filed before the IPEA/AU on November 13, 2000, during Chapter II of the P.C.T. international phase, to now read as follows:

4. (Amended) The floor framing system as claimed in [claims 1 to 3,] claim 1, wherein said elongate structural web members resemble an inverted top-hat section with two said flange elements and two said web elements with a third web element perpendicular to, and adjoining, the two said web elements.

5. (Amended) The floor framing system as claimed in [any one of claims 1 to 3,] claim 1, wherein said elongate structural web members resemble a box section with a slit in one side with two said flange elements being separated by the slit, two said web elements with a third web element perpendicular to, and adjoining, the two said web elements.

7. (Amended) The floor framing system as claimed in [any one of claims 4 to 6,] claim 4, wherein the ends of the web elements of the elongate web members are notched such that the flange elements of the web members enclose the web elements of the elongate structural members.

8. (Amended) The floor framing system as claimed in

[any one of claims 4 to 7,] claim 4, wherein at least one of said elongate structural web members is bent into a vee profile.

10. (Amended) The floor framing system as claimed in [any one of the preceding claims,] claim 1, wherein longitudinal central axes of the elongate structural members and at least one of said structural web [member(s)] members are substantially aligned.

11. (Amended) The floor framing system as claimed in [any one of the preceding claims,] claim 1, wherein the elongate structural web members are [either] perpendicular to [or diagonal to] said elongate structural members.

12. (Amended) The floor framing system as claimed in [any one of the preceding claims,] claim 1, wherein the elongate structural members are substantially parallel.

13. (Amended) The floor framing system as claimed in [any one of the preceding claims,] claim 1, wherein the elongate structural members are substantially in the same plane and form a triangular [or trapezoidal] framework [geometries.] geometry.

14. (Amended) The floor framing system as claimed in [any one of the preceding claims,] claim 1, wherein the flanges of the elongate structural members are extended and over bent flange stiffening elements.

15. (Amended) The floor framing system as claimed in [any one of the preceding claims,] claim 1, wherein the floor system is stiffened by at least one stiffening member oriented substantially perpendicular to the longitudinal axes of the elongate structural members.

20. (Amended) The floor framing system as claimed in [any one of claims 17 to 19,] claim 17, wherein the ends of the web elements of the elongate web members are notched such that the flange elements of the web members mate with the web elements of the elongate structural members.

21. (Amended) The floor framing system as claimed in [any one of claims 17 to 20,] claim 17, wherein at least one of said elongate structural web members is bent into a vee profile.

Please add the following claims:

--22. The floor framing system as claimed in claim 1, wherein the elongate structural web members are diagonal to said elongate structural members.

23. The floor framing system as claimed in claim 1, wherein the elongate structural members are substantially in the same plane and form a trapezoidal framework geometry.--

STRUCTURAL FRAMEWORK MEMBER FOR SUSPENDED FLOOR SYSTEMS

The present invention relates to improvements in elongated structural members for use in load bearing frameworks that form a floor system and, in particular, to steel structural members which are ideally joined together and to connecting structural elements, flooring, linings and the like, by nailing. The framework of the present invention is primarily used in relation to floor systems in domestic housing, but can be equally applicable to many different types of applications and to many different types of buildings and the steel structural members are preferably cold formed by roll forming.

BACKGROUND TO THE INVENTION

Conventional floor framing systems usually include bearers and joists, which run transverse to each other, and flooring, being of either sheet or board running substantially transverse to the floor joists. When floor systems require joists to span long distances, such as in the case of an elevated floor where joists span across supporting wall structures, it is typical to employ trussed floor joists which have two parallel chord members interconnected with web members. In such instances, known trussed floor joist assemblies have advantages such that services such as plumbing, electrical and other cables, air conditioning ducts, etc can pass transverse to the joists ameliorating the need to drill through a solid joist member or without protruding through the ceiling line of the space below. Furthermore, higher strength to weight ratio results in overall joist assemblies which weigh less than solid joist members with comparative spanning capabilities, therefore their light weight nature makes construction easier.

Known frameworks exist that have timber chord members interconnected via steel webs which have integral nail plate areas formed into their extremities. These nail plate areas fasten into the side faces of the timber chord members, thus requiring attachment of webs to both sides of the framework. The effective nail plate area is determined by the depth of the timber chord member. The length of the nail plate area is limited by design factors relating to the distance between webs and the eccentricity of load transferred into the web member. To this end, the size of the nail plate area required to support the necessary loads can govern the material content in the webs themselves, or conversely, the material content in the web determines the allowable load that can be transmitted by the web members. It is

thus desirable to firstly have web members loaded concentrically and secondly, to provide adequate connection capacity whilst allowing economic structural design of web members.

To this end it is also desirable to design the web and chord material to be equally strong in the connection. In known joist frameworks that have cold formed steel structural members, economy of web members has been achieved by reducing the gauge, or thickness, of the web members. However, this reduction of gauge diminishes connection capacities between the web and chord members. It is desirable to have both efficient structural members whilst maximising the capacity of connections between the members.

Known joist frameworks that have cold formed steel structural members are typically formed from conventional Cee section members such that the web members nest in the chord members, or of "top hat" chord members with various different web sections being able to nest between webs of the top hat section. All known prior art arrangements that include cold formed steel members are dependent upon substantially similar overall dimensions between the chord and the web members to enable nesting. This nesting feature of known prior art arrangements facilitates structural joints through the installation of a fastening means between adjacent surfaces of the members, ie flange element to flange element in the case of Cee sections, and between each of the web elements of a top hat chord member and an adjacent flange element of the web member. By the nature of the joints described above, economic fastener installation, whether by self-drilling screws, welding, riveting or by integral fastening means such as clinching, must be performed on each side of the framework. Whilst this fastening arrangement enables the use of economic fastening means through fixing adjacent surfaces, it results in an inefficient fabrication process. Furthermore, as there is the requirement of a minimum of one fastener each side of the framework on a particular web to chord joint, the efficiency of the joint overall, which requires a minimum of two fasteners is diminished because the load transmitted only requires the strength of one connection.

Therefore it is desirable to have both optimal and the lowest possible number of connections per unit length of framework. There is a significant benefit in the cost and speed of manufacture to install a single fastener that is of sufficient length to penetrate both sides of the joint from the one side of the framework. In the case of a framework having Cee sections, such a fastener, by necessity, will protrude from the overall width of the

framework, increasing the potential for injury and increasing the fastener cost. In the instance of a top hat chord member, such a fastener can still be contained within the overall width of the framework. In all known prior art arrangements relating to cold formed steel frameworks, the overall width of the assembly is substantially controlled by the depth of the web element of the chord members, thus establishing a similar size for the web members.

The chord and web members of a trussed floor joist have different functions and design requirements, and as such it would be desirable if within feasible geometrical parameters each were designed optimally to suit its separate function. Therefore it is desirable to optimally design each section for its intended purpose

It is also desirable to minimise capital expenditure on manufacturing equipment, particularly by utilising one roll former to produce both chord and web members. Known timber frameworks that use steel web members require different processes to produce the chord and web members.

The two aspects in the design philosophy of economical and material efficient sections are maximising the strength to weight ratio, and minimising the deflection to weight ratio, ie, maximising the second moment of area and minimising the material content. In a parallel trussed framework the second moment of area can be simplified to:

$$I_{xx} = \frac{1}{2}.A.d^2$$

where: A = cross–sectional area of chord members

d = distance between centroids of chord members

To maximise I_{xx} either the cross–sectional area of the chord members, A, or the distance between the centroids of the chord members, d, can be increased, but clearly what has most impact is d. The distance between the centroids of the chord members, d, must always be less than the overall depth of the truss, D, which is generally standardised according to building dimensional parameters. Therefore, it is desirable to have the centroid of the chord member as close to the extremity of the depth dimension of the truss as possible, ie, to make d/D as close to unity as possible. $y_c = \frac{D-d}{2}$

In known timber parallel trussed frameworks, where the chord member is a rectangular section of depth and breadth $D \times B$, $y_c = \frac{B}{2}$, or where D defines the width of the framework and B, the depth of the side face which the nail plate areas of the web members attach. In this case $d = D - B$.

In known steel parallel trussed frameworks having conventional Cee–section chord members, the centroid, by nature of the section, is closer to the extremities of the framework than is the case for timber chord members.

In known steel parallel trussed frameworks having conventional balanced "top–hat" chord members, the centroid is close to half the depth of the section, so such frameworks have similar relationships as the timber trussed framework above. The same is true for frameworks having Zed–section chord members.

In each instance above, economy of section property to material content can be maximised, within constraints of section geometry and fastening means, by increasing the overall width of the framework. However in the case of steel frameworks having Cee or Top–hat sections, the greater the width of the chord member, the greater the width of the web members required to nest in the members and as a consequence the frameworks become materially inefficient. Top–hat chord members that are sized to suit an efficient web member lose width across the top face and require increased material at the open end of the section, which results in lost section balance and moving the centroidal axis further from the extremities of the framework.

All known cold formed structural steel frameworks include chord members that have a continuous element that forms the extremity and defines the depth of the framework. Therefore it is seen that it is advantageous to provide a chord member that has sufficient width that forms the extremities of the framework and concentrating the material content of the chords at the extremities of the framework, thus maximising the section property of the framework, and, providing elements that enable the use of web members that are not substantially the same width as the width of the extreme element of the chord member.

Known cold formed structural steel frameworks that have chord members which have a single layer of material at the extremities of the framework do not provide adequate

restraint to nails used to attach flooring. It is therefore desirable to provide such restraint within the elements of the chord members.

Known timber structural framework members require blocking in situations where they butt into or run through intermediate structural beams, or bearers. It would therefore be desirable to maximise the clear distance between the chord members of the structural framework members such that beams can fit neatly between them, or to provide an efficient means of butting framework members into a beam member of the same depth. Another reason blocking is used is to provide a suitable base for fixing flooring and ceiling linings.

OBJECT OF THE INVENTION

The present invention has been conceived out of the need to provide a structural framework and components thereof, which lowers the cost of the structural framework in floors, by maximising section property to mass ratio, lowering the acquisition costs of the manufacturing equipment to produce the members, and lowering the required cost and time of manufacture by providing a method of assembly from one side of the framework. It is the object of the present invention to provide a structural framework, particularly a floor framing system, including the types of components used and their method of assembly and construction, which substantially overcomes or ameliorates the aforementioned disadvantages with known systems. At the very least the object of the present invention is to provide an alternative to known systems.

DISCLOSURE OF THE INVENTION

According to the present invention there is provided a floor framing system for a building, said floor framing system including a plurality of elongate load bearing framework members which are supported by the building or foundations thereof, and which support flooring material, ceiling linings, battens or other like ceiling framing members, said elongate load bearing framework members having at least two elongate structural members and at least one structural web member extending between said elongate structural members, wherein said elongate structural members have at least one web element which is substantially upright and at least one flange element which is perpendicular to said web element and said at least one web structural member has at least one web element which is substantially upright and at least one flange element which is perpendicular to said web

element, whereby the at least one web elements of said web structural members mate with said at least one web elements of said elongate structural members such that connection means can be applied at the mating locations.

In one preferred form, the elongate structural members resemble an inverted top-hat section with two flange elements and two web elements with a third web element perpendicular to and adjoining the two web elements. The third web elements of at least the elongate structural members is/are preferably discontinuous to allow the web elements to mate.

Preferably, the discontinuities are formed by notches or openings in the third web element which allows the web element of the web structural member to protrude therethrough.

In one preferred form, the elongate structural web members resemble an inverted top-hat section with two flange elements and two web elements with a third web element perpendicular to and adjoining the two web elements.

In another preferred form, the elongate structural web members resemble a box section with a slit in one side with two flange elements being separated by the slit, two web elements with a third web element perpendicular to and adjoining the two web elements. In another preferred form, the slit is the result of curling the edges of the flanges. Preferably, the ends of the web elements of the elongate web members are notched such that the flange elements of the web members enclose the web elements of the elongate structural members.

Preferably, the elongate structural web members is bent into a vee profile, and the bending of the elongate structural web members is facilitated by the provision of a slot intermediate the ends of the members.

Preferably, the longitudinal central axes of the elongate structural members and the structural web member(s) are substantially aligned centrally. Furthermore, the elongate structural web members are either perpendicular to or diagonal to the elongate structural members.

Preferably, the elongate structural members are substantially parallel, and/or the elongate structural members are substantially in the same plane and form triangular or trapezoidal framework geometries.

In a preferred form, the the flanges of the elongate structural members are extended and over bent flange stiffening elements.

In a preferred form, the floor system is stiffened by at least one stiffening member oriented substantially perpendicular to the longitudinal axes of the elongate structural members.

In preferred forms of the invention, the elongate structural members (also known as chord members) have holes in the central flange element such that the web elements thereof enclose the flange elements of the web members, with the resulting adjacent mating surfaces providing for a connection means between the members. This preferred arrangement comprises a double web joined such that it forms a "Vee" and which is flexible about the bend, thus reducing the number of individual components, allowing installation of two webs at the same time, providing for different web angle arrangements, and allowing the installation of the webs between the adjacent chord member elements whilst remaining firmly constrained in the assembly jig. A preferred web member comprises abutting flange lip stiffeners that are curled, each one in opposing crests and valleys, such that when a load is applied in the direction across the lip stiffeners, they do not lap or slide over each other, resulting in local distortion of the section.

In another form, the web members have their web elements notched at the extremities such that the flange elements of the web members enclose the web elements of the chord members, with the adjacent mating surfaces providing for a connection means between the members. This preferred form allows either individual or joined web members, whether a double web or a multiple greater than one, to be installed into the framework by sliding from one end along the chord members to the required location. This can be done at either a bend in a multiple web component member, such that the continuous flange elements of the web member nest over the webs of the chord member as described above, or when the free ends of adjacent web members are lapped at the junction with the chord member whereby only one fastening means is required to adequately form the joints. This preferred

form of the web member is sufficiently similar in cross-section to the chord member such that they can both be manufactured by the same equipment.

In a preferred form, the chord members resemble an inverted top-hat section and the web members form in the structural framework member is zig-zag like. The depth of the structural framework members can vary according to design and geometrical requirements, but in a floor system comprising a plurality of structural framework members the depth is substantially consistent.

In a preferred form the chord members comprise extended and over-bent flange stiffening elements that act as stabilisers for connection means such as in the fixing of flooring material.

In a preferred form, the floor system that comprises a plurality of structural framework members is stiffened by at least one structural stiffening member oriented substantially perpendicular to the length of the elongate structural framework members. In another preferred form this stiffening member comprises the same chord and web members of the plurality of structural framework members.

In a preferred form, the distance between the chord members of the structural framework member is substantially the same as the overall depth of transverse beams, stiffening members and the like, such that it is not necessary to block out and/or cut or notch the chord members, or provide brackets for fixing to beam flanges. In another preferred form the beam member is a composite of more than one of the framework members whereby the entire floor system is of the same depth without blocking and with substantially consistent properties between joist and beam members in relation to fixing of flooring and ceiling linings.

According to another aspect, there is provided a floor framing system for a building, said floor framing system including a plurality of elongate load bearing framework members which are supported by the building or foundations thereof, and which support flooring material, ceiling linings, battens or other like ceiling framing members, said elongate load bearing framework members having at least two elongate structural members and at least one structural web member extending between said elongate structural members, wherein said elongate structural members have at least one web element which is substantially

upright and at least one flange element which is perpendicular to said web element and said at least one web structural member has at least one flange element which is substantially upright and at least one web element which is perpendicular to said flange element, whereby the at least one flange elements of said web structural member mate with said at least one web elements of said elongate structural members such that connection means can be applied at the mating locations.

Preferably the elongate structural web members resemble an inverted Cee section with two flange elements and one web elements.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the present invention will now be described with reference to the drawings in which;

Fig. 1 is a cutaway perspective view of a elongate structural framework member of a preferred embodiment;

Fig. 2 is a section view A-A of a chord member of the elongate structural framework member in Fig. 1;

Fig. 3 is a cutaway perspective view of the chord member of the elongate structural framework member in Fig. 1;

Fig. 4 is a plan view A of the chord members of the elongate structural framework member in Fig. 1 showing a preferred notching arrangement;

Fig. 5 is a cutaway perspective view of a preferred embodiment of the web member of the elongate structural framework member in Fig. 1 showing a preferred notching arrangement;

Fig. 6 is a cutaway perspective view of another preferred embodiment of the web member of the elongate structural framework member in Fig. 1 showing curling of the flange lip stiffeners;

Fig. 7 is a section view B-B of the web member of the elongate structural framework member in Fig. 1;

Fig. 8 is an side view of a flexibly joined double web member of the elongate structural framework member in Fig. 1;

Fig. 9 is a perspective view of another preferred embodiment of a web member;

Fig. 10 is a detail showing the connection of the web member of Fig. 9 to a chord member;

Fig. 11 is a section view C-C of the web member of Fig. 9.

Fig. 12 is a cutaway side view detail of a preferred embodiment of the connections at the end of an elongate structural framework member;

Fig. 13 is an end view detail of a preferred embodiment of the connections at the end of an elongate structural framework member;

Fig. 14 is a cutaway detail showing an embodiment of a transverse stiffening member and fixing to an elongate structural framework member;

Fig. 15 is a section view D-D of preferred embodiments of a detail of Fig. 14;

Fig. 16 is another section view D-D of preferred embodiments of a detail of Fig. 14;

Fig. 17 is a view B detail of Fig. 16 showing an end notch of a vertical web member;

Fig. 18 is a partial end view of an elongate structural framework member showing fixture to wall support structures;

Fig. 19 is a partial sectional view of an elongate structural framework member showing fixture of flooring material to the top chord member;

Fig. 20 is similar to Fig. 19, but shows a butt joint of the flooring material;

Fig. 21 is a plan view showing fixture flooring material to the top chord, particularly staggering of the fastening means;

Fig. 22 is a partial sectional view of an elongate structural framework member showing fixture of ceiling lining to the bottom chord member;

Fig. 23 is a perspective view of a clip that can be used for centre fixing of ceiling lining to the bottom chord member;

Fig. 24 is similar to Fig. 23, but shows centre fixing of ceiling linings;

Fig. 25 is a cutaway perspective view of another embodiment showing a transverse stiffening member and fixing to an elongate structural framework member;

Fig. 26 is a side view of the arrangement of Fig. 25;

Fig. 27 is a section E-E of Fig. 25;

Fig. 28 is a side view similar to Fig. 26 but showing two bent web members;

Fig. 29 is a perspective view of the bent web member of the embodiment as shown in Fig. 25;

Fig. 30 is a side view of the web member of Fig. 29;

Fig. 31 is a section F-F of Fig. 30;

Fig. 32 is a detailed view G of Fig. 30;

Fig. 33 is a section view of an alternative to the web element of Fig, 29; and

Fig. 34 is a section view the chord member of Fig. 25.

BEST MODE OF CARRYING OUT THE INVENTION

An elongate structural framework member 10 as shown in Fig. 1 is formed as a parallel chord truss having a pair of parallel elongate structural or chord members 11(a) and (b) with a web structure 13 therebetween being formed by vertical web members 13(a) and flexibly joined double web members 13(b), therebetween. The chord members 11 in this embodiment as seen in Figs. 2 and 3 resemble an inverted top hat having two upright web elements 14(a) and (b) joined by a perpendicular web element 14 (c) in the form of a U with two flange elements 15(a) and (b) extending from the web elements 14(a) and (b) and having extended and over bent stiffening elements 16(a) and (b).

The flexibly joined double web members 13(b), as seen in Figs. 5, 7 and 8 resemble a box section with a slit 17 in one side with two flange elements 18(a) and (b) being separated by the slit 17, and with two web elements 19(a) and (b) with a third web element 19(c) perpendicular to and adjoining the two web elements 19(a) and (b). Another embodiment is shown in Fig. 6 where the slit 17 is the result of curling the edges of the flange elements 18(a) and (b) in opposing fashion forming a rigid member, particularly for the purpose of installing fasteners across the member for joining purposes.

The flexibly joined double web members 13(b) are able to be bent as seen in Fig. 8 by the provision of a notch 20 in the two flange elements 18(a) and (b) and partially in the two web elements 19(a) and (b) to form an apex 21.

The chord members 11(a) and (b) have spaced apart notches or openings 22 in the web element 19(c). The notches 22 are provided to receive either the free ends 23 of the flexibly joined double web members 13(b) or the vertical web member 13(a), or the apex 21 of the bent flexibly joined double web members 13(b). Only a half notch 22(a) is required at the end 24 of the chord member 11(a) as seen in Fig. 1 where the vertical web member 13(a) is received. Fig. 4 shows the relative location of the notches 22 in the top and bottom chord members 11(a) and (b) respectively.

The joints between the chord members 11(a) and (b) and the vertical web members 13(a) and flexibly joined double web members 13(b) are formed by the two web elements 19(a) and (b) of the web members 13(b) nesting within the web elements 14(a) and (b) of the chord members 11(a) and (b) such that the inside surfaces of the web elements 14(a) and (b) of the chord members 11(a) and (b) abut against the outside surfaces of the two web elements 19(a) and (b) of the web members 13(b) with a fastener 25 (preferably a nail) completing the joint. When the fastener 25 is installed in this way, it provides a shear connection between the members.

Another embodiment of the flexibly joined double web members 26 (corresponding to 13(b)), is illustrated in 9 to 11. The web members 26 resemble an inverted top hat having two upright web elements 27(a) and (b) joined by a perpendicular web element 27(c) in the form of a U with two flange elements 28(a) and (b) extending from the web elements 27(a) and (b).

In the preferred embodiment of the web member of Figs. 9 to 11, instead of notching the flanges, the entire web member is bent at 29 into a Vee form that represents a double joined web member 26. The free ends 30 of such a double web members 26 are notched to enable nesting over the web elements 14(a), (b) and (c) of the chord members 11(a) and (b) as shown in Fig. 10. The bend 29 is formed such that it also nests over the web elements 14(a), (b) and (c) of the chord members 11(a) and (b) of the chord member in the way described, thus allowing a single fastener 25 to fix the web members 26 to the chord members 11(a) and (b). Such a configuration of the web members 26 also provides a means for installing web members 26 by sliding along the chord members 11(a) and (b) to the position required. The cross-section of the web member of Fig. 11 is substantially similar to that of the chord members 11(a) and (b), thus enabling manufacture of both sections from the same roll former.

When the fastener 25 is installed in either of these preferred embodiments, it provides a shear connection between the members at two distinct points along the shank at locations 31 and 32 as seen in Fig. 10.

A number of elongate structural framework members 10 can be tied to a transverse stiffening member 33 as shown in Fig. 14. A vertical web member 34 is joined to the outside surface of the web element 14(a) or (b) of the chord member 11(a) by a fastener 25 as shown in section D-D of Figs. 15 and 16 respectively. View B of Fig. 17 shows how the end of the vertical web member 34 is notched to provide the joint shown in Fig. 16, where the fastener 35 penetrates through the chord member at location 36. The transverse stiffening member 33 is joined to the vertical web member 34 by fastener 37 and to the chord member 11(a) by fastener 38.

In Fig. 18 the elongate structural framework member 10 is joined to a supporting wall structure 39 by fastener 40 installed through the over bent stiffening elements 16(a) and (b) and flange elements 15(a) and (b) of the bottom chord member 11(b).

Flooring material 41 is attached to the top chord member 11(a) of the elongate structural framework member 10 as shown in Figs. 19 to 21 by fasteners 42, preferably nails, which penetrate the flange elements 15(a) and (b) and over bent stiffening elements 16(a) and (b), and necessary adhesive 43. The stiffening elements 16(a) and (b) provide support for the fastener 42 at location 43. A butt joint 44 is shown in Fig. 20, where one flooring sheet or

board 45 is attached to one flange element 15(a) of the top chord member 11(a) and the abutting flooring sheet or board 45 is attached to the second flange element 15(b) of the top chord member 11(a). Intermediate fixing 46 of floor sheeting 45 is staggered across the two flange elements 15(a) and (b) of the top chord member 11(a).

Ceiling linings 47 can be attached to the bottom chord member 11(b) of elongate structural framework members 10 by fasteners 48 and necessary adhesive 49 as shown in Fig. 22. A clip 50 can be used to snap over the flange and lip elements 15(a)/16(a) and 15(b)/16(b) of the bottom chord member 11(b) where fastener 48 is required centrally.

Another embodiment of the framework member 50 is shown in Figs.25 to 34. The framework 50 is formed as a parallel chord truss having a pair of parallel elongate structural or chord members 51(a) and (b) with a web structure 13 therebetween being formed by vertical web members 53(a) and bent web members 53(b), therebetween. The lower chord member 51(b) is shown seated on bearers 54 whilst a transverse stiffening member 55 is fastened thereto in a similar manner as described previously.

The bent web members 53(b) as seen in Fig.s 29 to 32 are Cee sections with a web element 56 and two flange elements 57 extending therefrom. The web member 53(a) is bent, preferably by a pipe bender or the like, and a bulge 58 is developed at the bend 59 in the web element 56. Notches 61 are provided at the free ends so that the bent web member 53(a) nests against the chord member 51(b).

A variation of the bent web member 53(b) is shown in Fig. 33 which has rolled over edges 62.

The shape of the chord members 51 are shown in Fig, 34.

The foregoing describes only some of the embodiments of the invention and modifications obvious to those skilled in the art can be made thereto without departing from the scope of the present invention.

CLAIMS

1. A floor framing system for a building, said floor framing system including a plurality of elongate load bearing framework members which are supported by the building or foundations thereof, and which support flooring material, ceiling linings, battens or other like ceiling framing members, said elongate load bearing framework members having at least two elongate structural members and at least one structural web member extending between said elongate structural members, wherein said elongate structural members have at least one web element which is substantially upright and at least one flange element which is perpendicular to said web element and said at least one web structural member has at least one web element which is substantially upright and at least one flange element which is perpendicular to said web element, whereby the at least one web elements of said web structural member mate with said at least one web elements of said elongate structural members such that connection means can be applied at the mating locations.

2. The floor framing system as claimed in claim 1, wherein said elongate structural members resemble an inverted top-hat section with two said flange elements and two said web elements with a third web element perpendicular to and adjoining the two said web elements.

3. The floor framing system as claimed in claim 2, wherein said third web elements of at least said elongate structural members is/are discontinuous to allow said web elements to mate.

4. The floor framing system as claimed in claim 3, wherein said discontinuities are formed by notches or openings in the third web element which allows said web element of said web structural member to protrude therethrough.

5. The floor framing system as claimed in claim 1, wherein said elongate structural web members resemble an inverted top-hat section with two said flange elements and two said web elements with a third web element perpendicular to and adjoining the two said web elements.

6. The floor framing system as claimed in any one of claims 1 to 4, wherein said elongate structural web members resemble a box section with a slit in one side with two said flange

elements being separated by the slit, two said web elements with a third web element perpendicular to and adjoining the two said web elements.

7. The floor framing system as claimed in claim 6, wherein said slit is the result the edges of the flanges of curling adjacent the slit being curled.

8. The floor framing system as claimed in any one of claims 5 to 7, wherein the ends of the web elements of the elongate web members are notched such that the flange elements of the web members enclose the web elements of the elongate structural members.

9. The floor framing system as claimed in any one of claims 5 to 8, wherein at least one of said elongate structural web members is bent into a vee profile.

10. The floor framing system as claimed in claim 9, wherein the bending of the at least one of said elongate structural web members is facilitated by the provision of a slot intermediate the ends of the members.

11. The floor framing system as claimed in any one of the preceding claims, wherein longitudinal central axes of the elongate structural members and said structural web member(s) are substantially aligned centrally.

12. The floor framing system as claimed in any one of the preceding claims, wherein the elongate structural web members are either perpendicular to or diagonal to said elongate structural members.

13. The floor framing system as claimed in any one of the preceding claims, wherein the elongate structural members are substantially parallel.

14. The floor framing system as claimed in any one of the preceding claims, wherein the elongate structural members are substantially in the same plane and form triangular or trapezoidal framework geometries.

15. The floor framing system as claimed in any one of claims 2 to 14, wherein the the flanges of the elongate structural members are extended and over bent flange stiffening elements.

16. The floor framing system as claimed in any one of the preceding claims, wherein the floor system is stiffened by at least one stiffening member oriented substantially perpendicular to the longitudinal axes of the elongate structural members.

17. A floor framing system for a building, said floor framing system including a plurality of elongate load bearing framework members which are supported by the building or foundations thereof, and which support flooring material, ceiling linings, battens or other like ceiling framing members, said elongate load bearing framework members having at least two elongate structural members and at least one structural web member extending between said elongate structural members, wherein said elongate structural members have at least one web element which is substantially upright and at least one flange element which is perpendicular to said web element and said at least one web structural member has at least one flange element which is substantially upright and at least one web element which is perpendicular to said flange element, whereby the at least one flange elements of said web structural member mate with said at least one web elements of said elongate structural members such that connection means can be applied at the mating locations.

18. The floor framing system as claimed in claim 17, wherein said elongate structural members resemble an inverted top-hat section with two said flange elements and two said web elements with a third web element perpendicular to and adjoining the two said web elements.

19. The floor framing system as claimed in claim 18, wherein said third web elements of at least said elongate structural members is/are discontinuous to allow said web elements to mate.

20. The floor framing system as claimed in claim 19, wherein said discontinuities are formed by notches or openings in the third web element which allows said web element of said web structural member to protrude therethrough.

21. The floor framing system as claimed in claim 1, wherein said elongate structural web members resemble an inverted Cee section with two said flange elements and one said web elements.

22. The floor framing system as claimed in any one of claims 19 to 21, wherein the ends of the web elements of the elongate web members are notched such that the flange elements of the web members mate with the web elements of the elongate structural members.

23. The floor framing system as claimed in any one of claims 19 to 22, wherein at least one of said elongate structural web members is bent into a vee profile.

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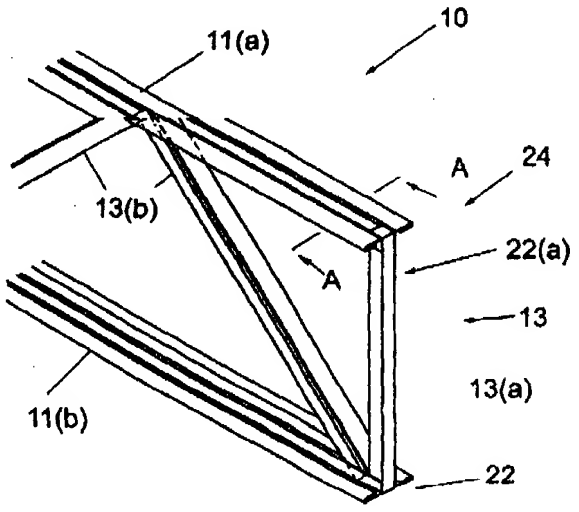
(54) Title: STRUCTURAL FRAMEWORK MEMBER FOR SUSPENDED FLOOR SYSTEMS

(57) Abstract

A floor framing system including a plurality of elongate load bearing framework members (10) which are supported by the building or foundations thereof, and which support flooring material or other like. The elongate load bearing framework members having at least two elongate structural members (11a, 11b) and at least one structural web member (13a, 13b) extending between said elongate structural members (11a, 11b). The elongate structural members have at least one web element which is substantially upright and at least one flange element which is perpendicular to said web element. The web structural member (13a, 13b) has at least one web element which is substantially upright and at least one flange element which is perpendicular to said web element, whereby the at least one web element of said web elements mate with said at least one web element of said elongate structural members such that connection means can be applied at the mating locations (22a).



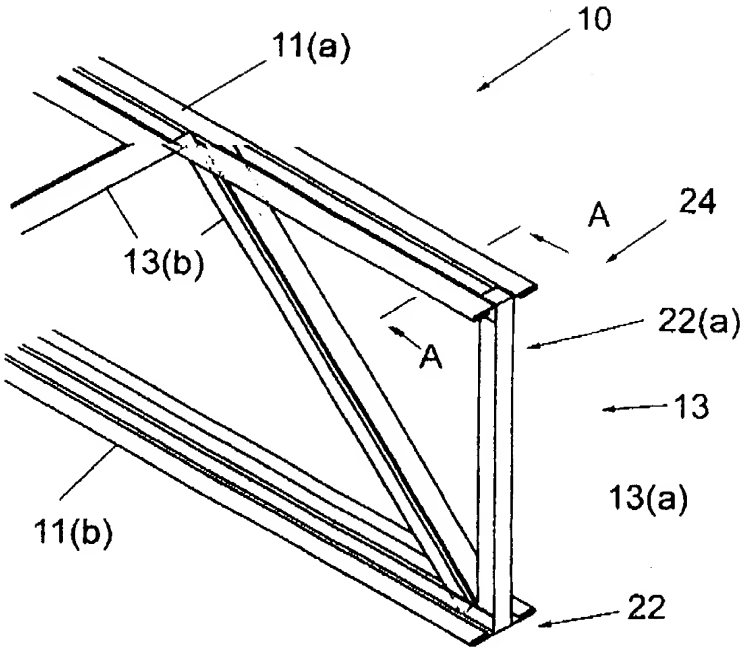
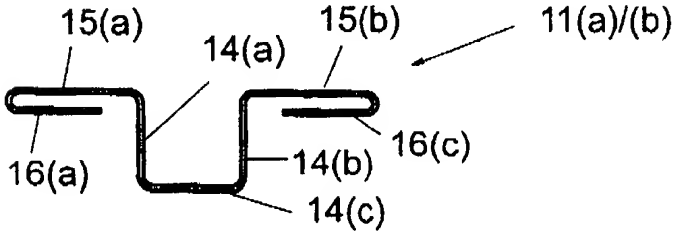

11(a)
10
A
24
13(b)
22(a)
A
13
13(a)
11(b)
22

Fig. 1


15(a)
14(a)
15(b)
11(a)/(b)
16(c)
16(a)
14(b)
14(c)

A-A

Fig. 2

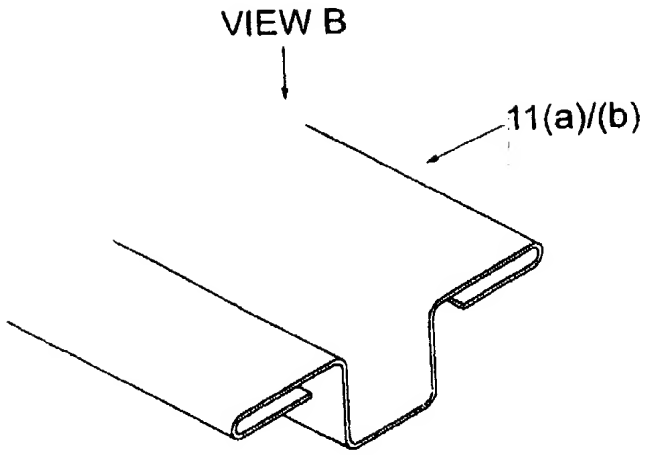


Fig. 3

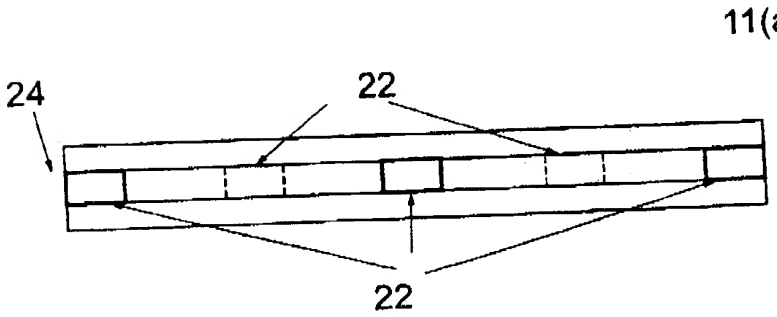


Fig. 4

3/15

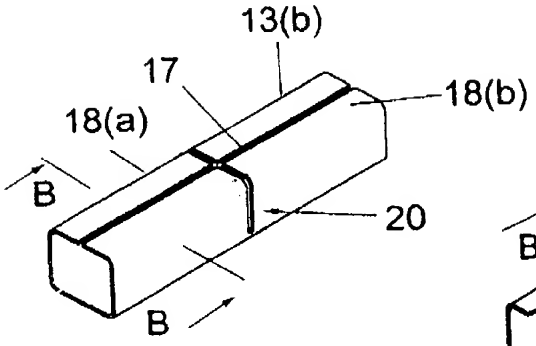


Fig. 5

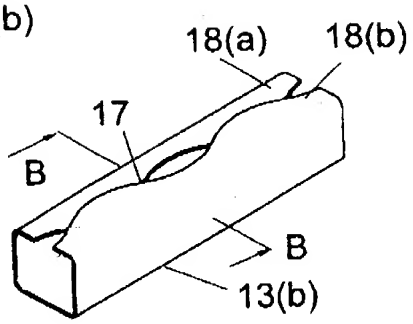


Fig. 6

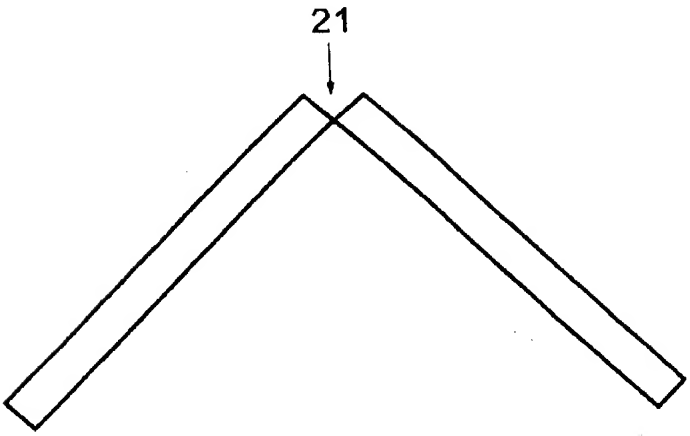


Fig. 8

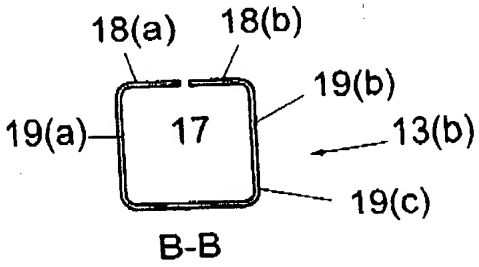


Fig. 7

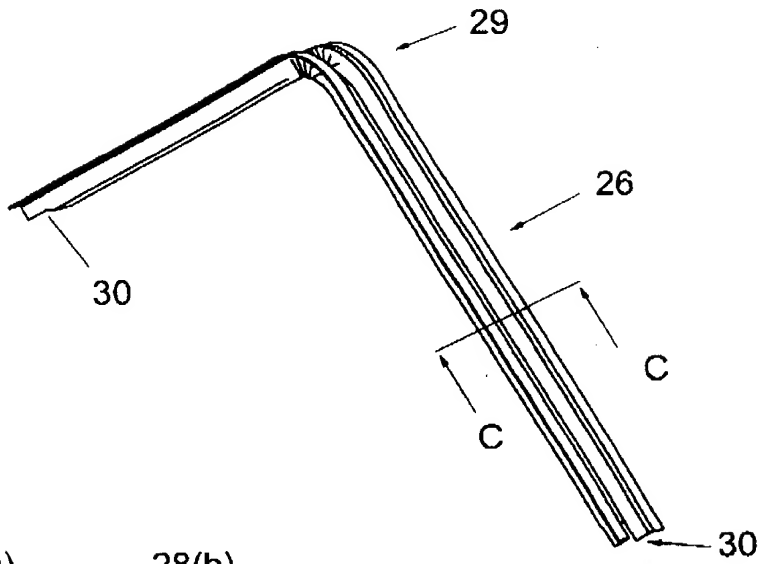


Fig. 9

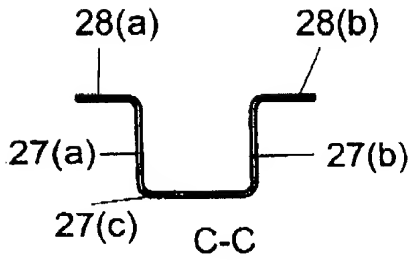


Fig. 11

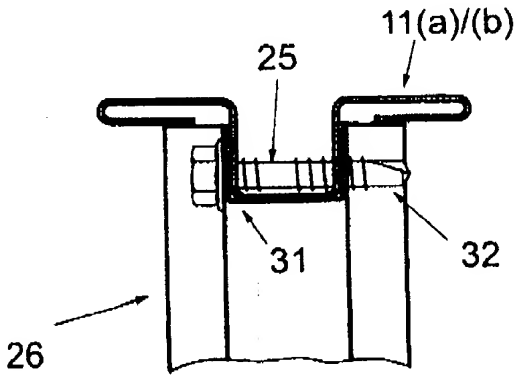


Fig. 10

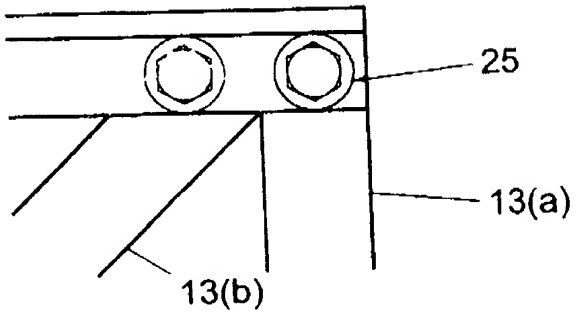


Fig. 12

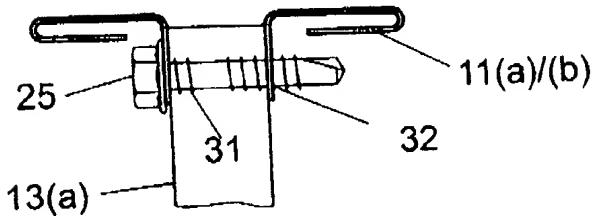


Fig. 13

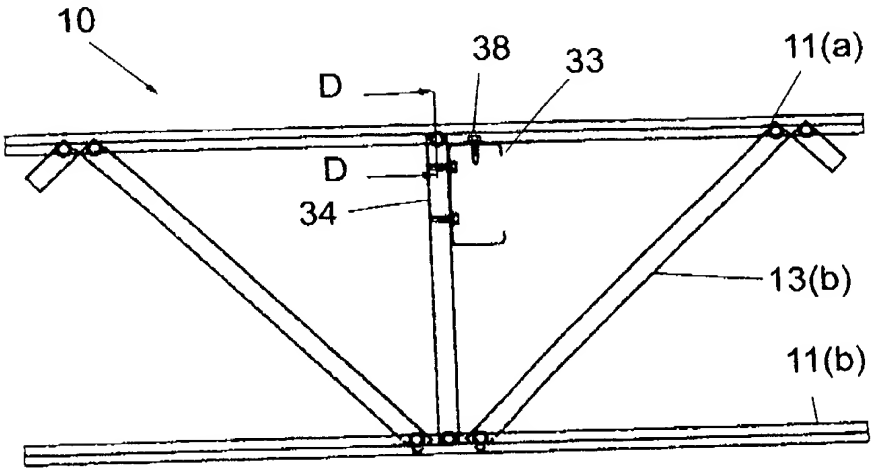


Fig. 14

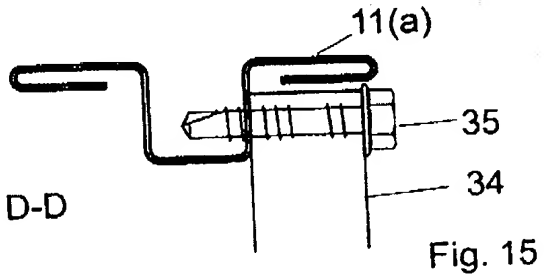


Fig. 15

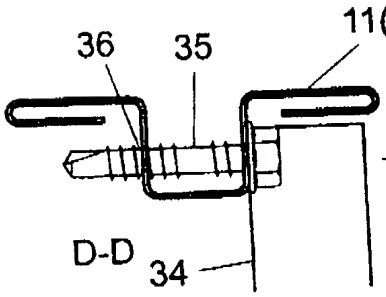


Fig. 16

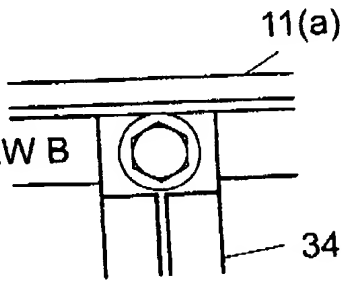


Fig. 17

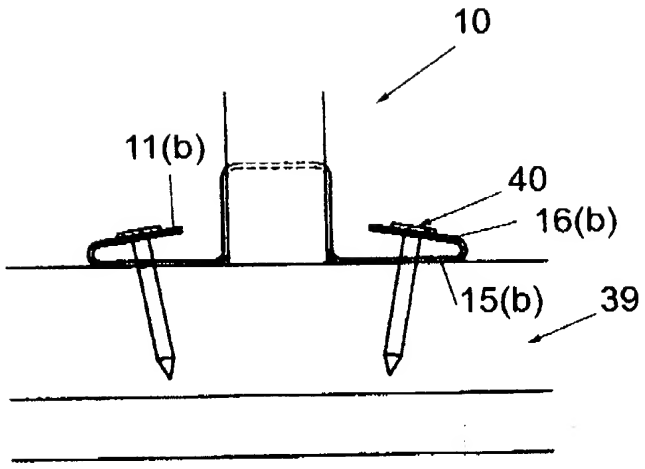


Fig. 18

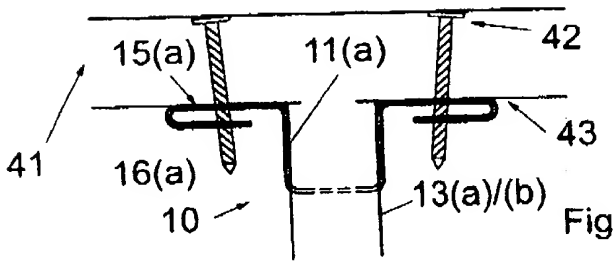


Fig. 19

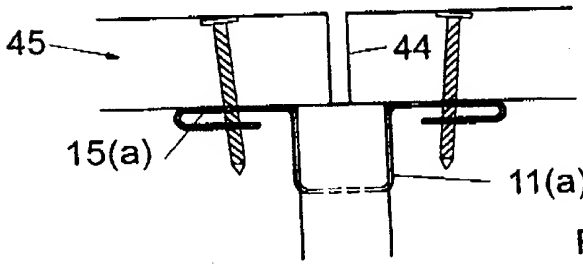


Fig. 20

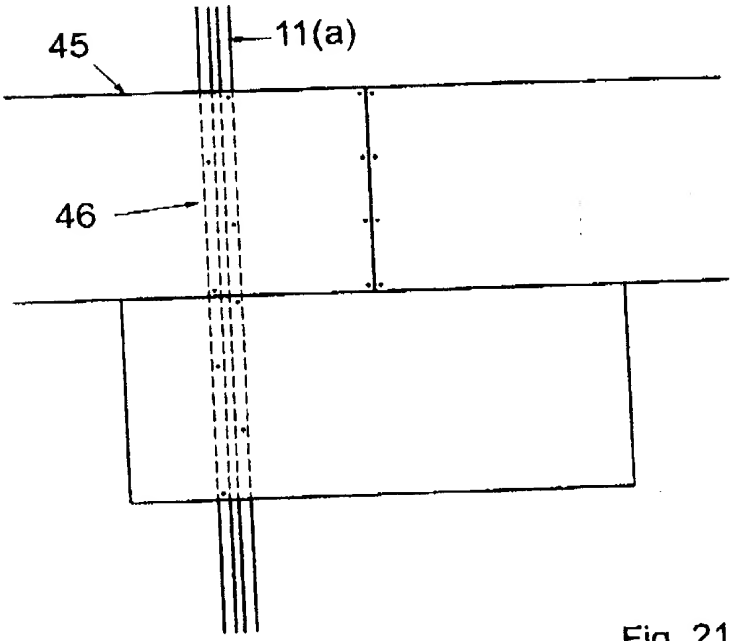


Fig. 21

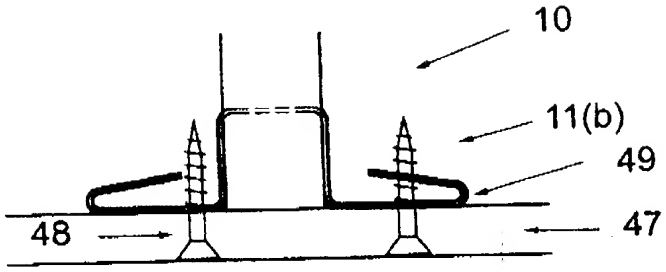
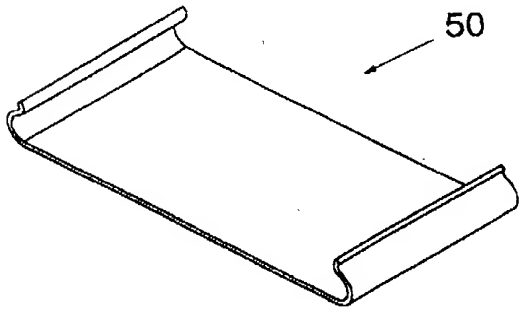


Fig. 22



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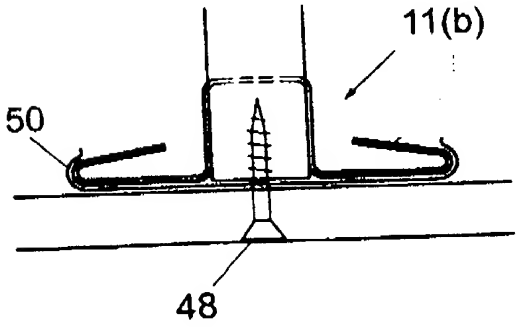

Fig. 24

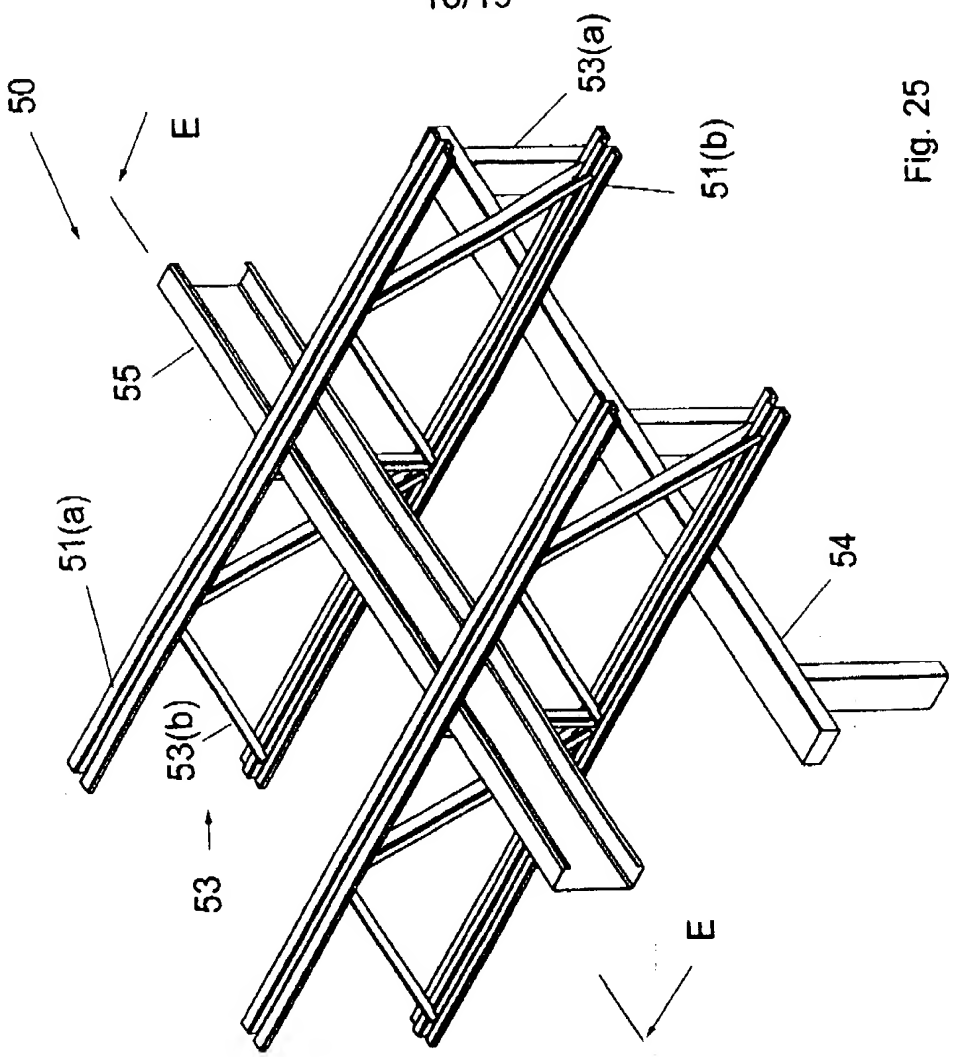

Fig. 25

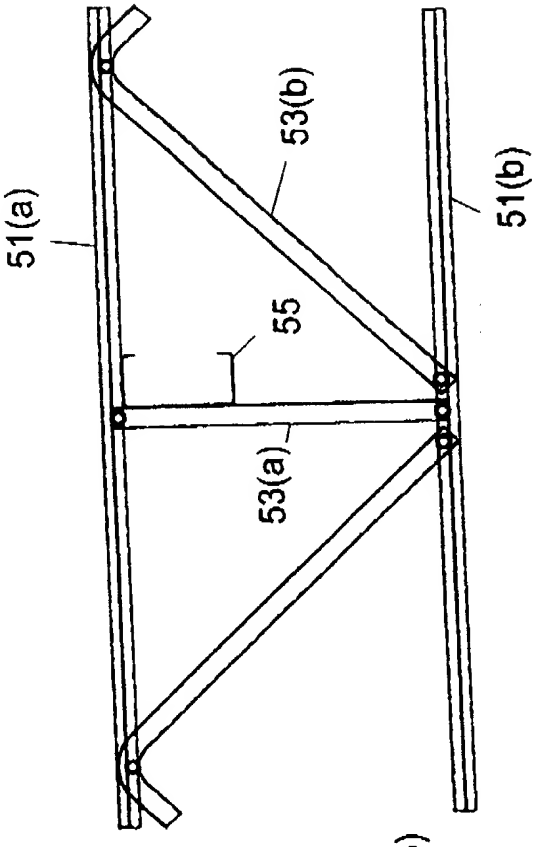

Fig. 26

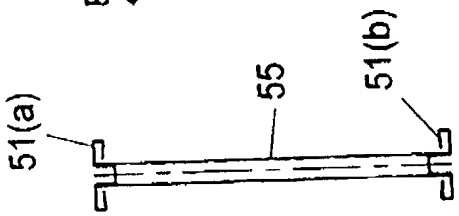

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Fig. 27

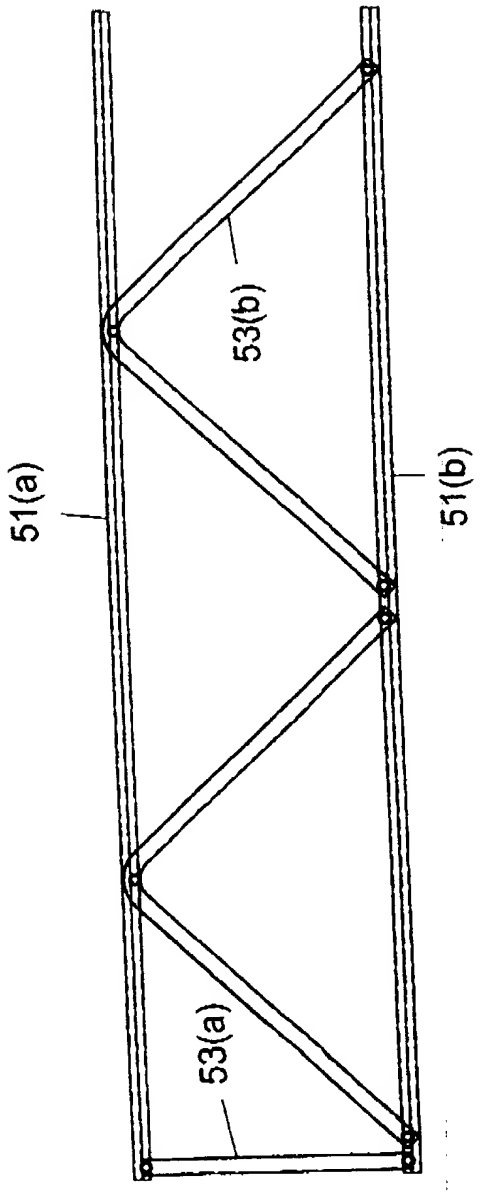

Fig. 28

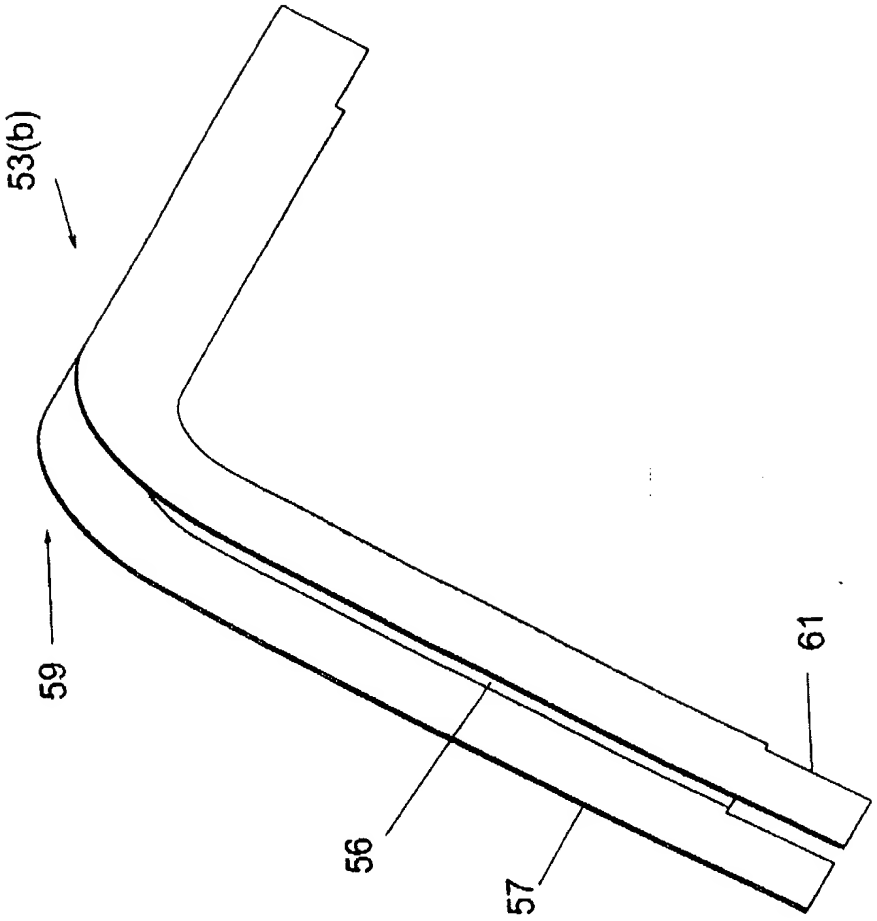

Fig. 29

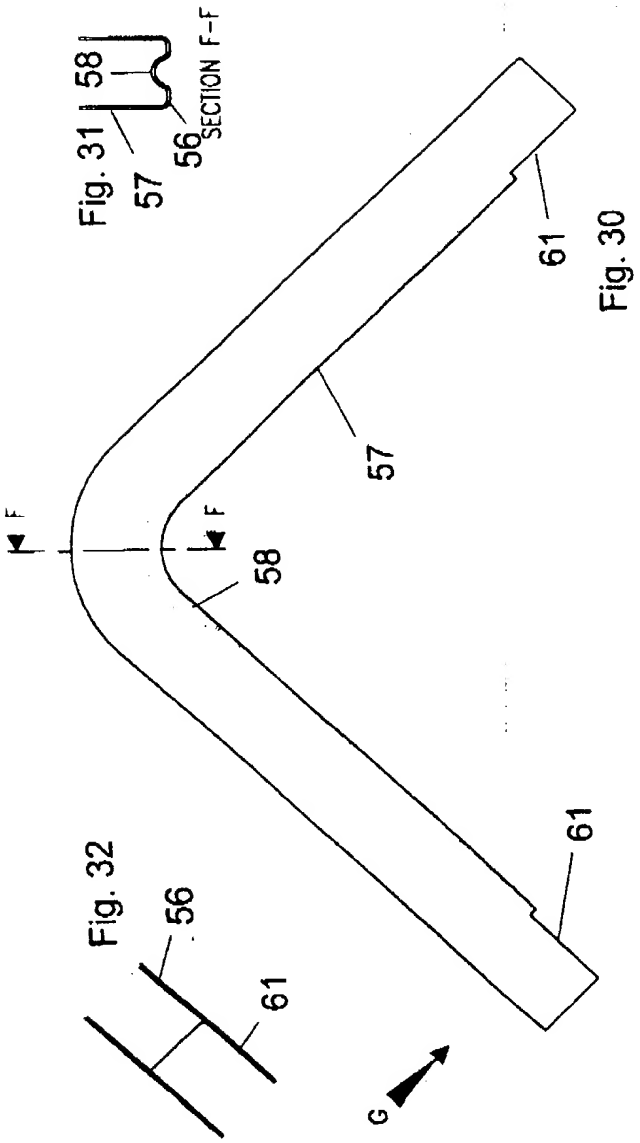

Fig. 31

Fig. 30

Fig. 32

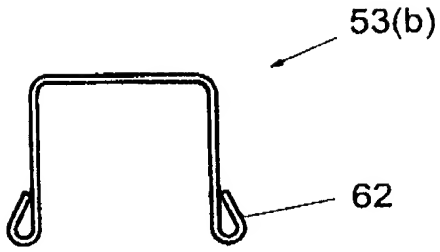

Fig. 33

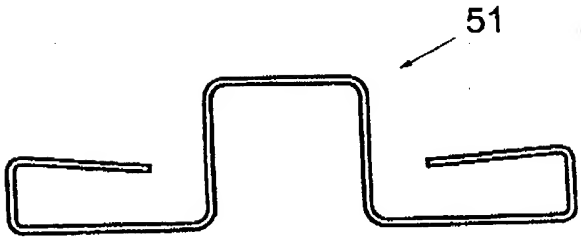

Fig. 34

#7

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

STRUCTURAL FRAMEWORK MEMBER FOR SUSPENDED FLOOR SYSTEMS

the specification of which

(check one)

☐ is attached hereto.

☒ was filed on 22 DECEMBER 1999 as

Application Serial No. PCT/AU99/01144

and was amended on 13 NOVEMBER 2000 (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed	
PP7827	AUSTRALIA	22 DECEMBER 1998	☒ Yes	☐ No
(Number)	(Country)	(Day/Month/Year Filed)		
			☒ Yes	☐ No
(Number)	(Country)	(Day/Month/Year Filed)		
			☐ Yes	☐ No
(Number)	(Country)	(Day/Month/Year Filed)		

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

[redacted]

(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (*list name and registration number*)

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Full name of sole or first inventor	Bradbury Frank Golledge
Inventor's signature	Date: Dec. 10, 2002
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Citizenship	Australian
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Full name of second joint inventor, if any	
Second inventor's signature	Date
Residence	
Citizenship	
Post Office Address	

(Supply similar information and signature for third and subsequent joint inventors.)

Form PTO-FB-110 (8-83) Patent and Trademark Office-U.S. DEPARTMENT OF COMMERCE

Applicant/Xxxxxxxx: Bradbury Frank Golledge
Serial No./Xxxxxxxx.: 09/869,188
Filed or Issued:
For: STRUCTURAL FRAMEWORK MEMBER FOR SUSPENDED FLOOR SYSTEMS

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) and 1.27(b)) - INDEPENDENT INVENTOR

As below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled STRUCTURAL FRAMEWORK MEMBER FOR SUSPENDED FLOOR SYSTEMS described in

[ ] the specification filed herewith
[X] application serial no. PCT/AU99/01144, filed December 22, 1999
[ ] patent no._____, issued_____

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a non-profit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

[X] no such person, concern, or organization
[ ] persons, concerns or organizations listed below*

*NOTE: Separate verified statements are required from each person, concern or organization having rights to the invention averring to their status as small entities. (37 C.F.R. 1.27)

FULL NAME_____
ADDRESS_____
[ ] INDIVIDUAL [ ] SMALL BUSINESS CONCERN
[ ] NON-PROFIT ORGANIZATION

FULL NAME_____
ADDRESS_____
[ ] INDIVIDUAL [ ] SMALL BUSINESS CONCERN
[ ] NON-PROFIT ORGANIZATION

FULL NAME_____
ADDRESS_____
[ ] INDIVIDUAL [ ] SMALL BUSINESS CONCERN
[ ] NON-PROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in the loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 C.F.R. 1.28(b))

I hereby declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF INVENTOR	NAME OF INVENTOR	NAME OF INVENTOR
Bradbury Frank Golledge		
Signature of Inventor	Signature of Inventor	Signature of Inventor
10TH AUGUST 2001		
Date	Date	Date